

Serial No. 09/352,404

Docket No. CUPO-20-2 (3037-4167)

IN THE SPECIFICATION:

Page 6, third paragraph, REPLACE as follows:

A RF modulated signal 17 is received at the receiver 18 and processed in accordance with OFDM. The signal 17 is recovered as an In Phase component (I) and a Quadrature Phase component (Q) of a baseband signal 20 (not shown) by the unit 16. The I and Q outputs are each provided to standard analog-to-digital converters 24¹ and 24², respectively responsive to receiver sampling clocks 26¹ and 26², respectively. The (I) and (Q) components of the received signal are each sampled in the converters at 544 points using the receiver sampling clocks. The output of the converter 24 is provided to a standard 2-frame FIFO 28 which then feeds into an offset correcting circuit 30 and a correlator 32. Starting from the first sample in the FIFO 28, a complex auto-correlation function R_i of the I and Q components of the received symbol is computed for $i = 0, 1, \dots, 543$ in the following way. Let z_k be the received $k - ih$ sample

$$z_k = x_{I,k} + jx_{Q,k}$$

where $x_{I,k}$ and $x_{Q,k}$ are, respectively, the I and Q components of the received sample. Then

$$R_i = \sum_{k=i}^{i+511} z_k z_{k+512}^*$$

where z_k^* is the complex conjugate of z_k . Values of R_i for L latest frames are saved in the L-frame FIFO 34. Suppose $R_i(j)$ is the value of the auto-correlation function R_i of the $j - ih$ frame of that FIFO. Its average value \bar{R}_i is then computed as

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$$\bar{R}_i = \sum_{j=1}^L R_i(j).$$

The amplitude and phase components of $\bar{R}_i, i = 0, 1, \dots, 543$ are provided to an OFDM frame synchronization estimator 36 and an offset estimator 38. The frame synchronization estimator 36 uses the amplitude of the auto-correlation function to estimate the frame boundary. The index at which the amplitude of \bar{R}_i is maximum for all i with $i = 0, 1, \dots, 543$ gives the estimated frame boundary. For each incoming frame, this index which is actually a pointer to a specific sample of that frame is provided to a digital phase-locked loop 40 which generates a sample number indicating the desired OFDM frame boundary.

Page 7, third paragraph that continues to page 8, REPLACE as follows:

As shown in Figure 2(b), the phase-locked loop works in the following manner. Suppose that at any instant p_1 and p_2 are, respectively, the estimated frame boundary that is applied to the input of the phase-locked loop and the desired frame boundary at the output of the loop. Depending on the difference between the instantaneous values of p_1 and p_2 , the loop gain is dynamically adjusted in each symbol period. The difference $p_1 - p_2$ is obtained in ~~summing~~ comparator circuit 41 and saved in a FIFO 42. The saved differences are averaged over eight latest frames and passed through a first-order lead-lag filter 43, integrated in a modulo integrator 44, rounded off to the nearest integer value, and amplified in amplifier 45. The amplifier provides an input to a counter 46 which provides the sample number for the desired frame

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boundary p_2 . ~~The~~ Returning to Fig. 2A, the amplifier also provides to an external programmable counter 47 and output signal p_2 , locked to the transmitter signal p_1 in the phase locked loop. The counter 47 is responsive to a clock 48 and provides a receiver clock chain output phase locked to the clock of the transmitter.